

CLAIMS

1. A method for reducing fouling and/or scaling in process equipment containing flowing fluids, by imposing a direct current (DC) electric potential on the wall of the pipe/duct in order to remove the electric contribution to the friction factor, where the imposed DC electric potential is regulated by a regulating unit which is fed with information of measured fluid properties,
c h a r a c t e r i s e d i n that the imposed DC electric potential is constantly regulated such that the imposed DC-potential has the exact same strength but with opposed polarity as the naturally occurring potential due to build-up of electrical charges on the wall from the interaction between the flowing fluid and wall material.
2. A method according to claim 1,
c h a r a c t e r i s e d i n that the regulating unit is fed with information of measured fluid properties upstream of the part of the pipe/duct that is exposed to the DC field, and that the measured fluid properties may be one or more of the properties contained in the group comprising average flow velocity, corrosion potential, pH, concentration of specific ions contained in the fluid, electrical conductivity, pressure, and temperature.
3. A method according to claim 1 or 2,
c h a r a c t e r i s e d i n that the DC electric potential is in the range of -5.0 to +5.0 V (saturated calomel electrode, SCE).
4. A method according to claims 1 - 3,
c h a r a c t e r i s e d i n that the DC electric potential is in the range of -2.5 to +2.5 V (saturated calomel electrode, SCE).
5. A method according to claims 1 - 3,
c h a r a c t e r i s e d i n that the DC electric potential is in the range of -1.0 to +1.0 V (saturated calomel electrode, SCE) or less.
6. A method according to claims 1 - 5,
c h a r a c t e r i s e d i n that the flow is a streaming pure fluid in gas or liquid state, a colloidal fluid, a fluid which contains inclusions in the form of particles, a mixture of several fluids, in single or multiphase, or a mixture of one or more of these
7. A method according to claim 1 - 6,
c h a r a c t e r i s e d i n that the flow can have Reynolds numbers in the range 1 to 5 000 000.

8. An apparatus for performing the method given in claims 1-7, characterised in that a DC electric potential generator is connected with one polarity to an electrically insulated part of the pipe/duct wall and the other polarity to the part of the pipe that is downstream of the insulated part, and that the DC electric generator is controlled by a regulating unit which is fed with measurements of the fluid properties upstream of the part that is exposed to the DC electric potential.

9. An apparatus according to claim 8, characterised in that the regulating unit is fed with one or more of the fluid properties contained in the group comprising average flow velocity, corrosion potential, pH, concentration of specific ions contained in the fluid, electrical conductivity, pressure, and temperature.